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REMARKS/ARGUMENTS

Thorough examination and careful review of the application by the Examiner is noted and appreciated.

The examiner has objected to Claims 2, 7, 8, 16, and 21-24.

The examiner has allowed subject matter in claims 1-15, and 25.

The examiner has rejected claims 16-19.

By way of the foregoing amendments, claims 2, 7-8, 16, 20, and 22 have been amended.

Claim 21 has been cancelled.

Accordingly, upon entry of this Response, Claims 1-20, 22-25 are pending.

The changes in the specification, claims, and drawings do not introduce new matter but clarify matters shown and described in the application as filed. The foregoing amendments and following remarks are believed to be fully responsive to the Office Action mailed May 13, 2004 (hereinafter "OA") and render all currently pending claims at issue patentably distinct over the references cited by the Examiner.

The foregoing amendments are taken in the interest of expediting prosecution and there is no intention of surrendering any range of equivalents to which Applicant would otherwise be entitled in view of the prior art. Reconsideration and

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examination of this application is respectfully requested in light of the foregoing amendments and the following remarks.

EXAMINER'S OFFICE ACTION

In the May 13, 2004 Office Action referenced above, the Examiner:

objected to claims 2, 7-8, and 16 as having informalities;
objected to claims 21-24 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims;

rejected claims 16-20 under 35 USC § 102(b) as being anticipated by Klauschek et. al., U.S. Patent No. 3,919,609 (hereinafter "KLAUTSCHEK"); and

rejected claims 17-19 under 35 USC §103(a) as being obvious over KLAUTSCHEK in view of Piety et. al., U.S. Patent No. 5,875,420 (hereinafter "PIETY").

Claim Objections

Claims 2, 7-8, and 16 are objected to as having informalities.

Examiner suggested amendment of claims 2, 7, 8 and 16 as follows:

- (a) Claim 2, line 1, delete the word "method".
- (b) Claims 7-8, change the dependency to depend upon claim 4. This change is required because the recitation "said positive feedback assembly" is defined in claim 4.

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- (c) Claim 16, last line, change the recitation "said certain operational" to -said certain operational state--.

Accordingly, claims 2, 7-8 and 16 have been amended to correct any informalities, thereby obviating Examiner's objections.

With regard to claim 2, the word "method" has been deleted from claim 2, line 1.

With regard to claim 7-8, each of the claims' dependency have been changed to depend upon claim 4.

With regard to claim 16, claim 16 has been amended to delete the words "operational" and "operational state" and replace the words with "certain condition".

Thus, the objection of the informality present in the original claim 16 has been obviated.

The claims having the terms in question have been amended to clearly define any uncertainties and to correct any informalities. Thus, the objection is believed to be obviated.

Claims 21-24 were objected to as being dependent upon a rejected base claim. The Examiner stated on OA, page 5, clause 5 that claims 21-24 would be allowable if rewritten in independent from including all of the limitations of the base claim and any intervening claims.

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Accordingly, claim 21 was cancelled and the limitations of claim 21 were incorporated into independent claim 20. Thus, the objection to claim 21 has been obviated. Claim 22 was amended to depend on claim 20, and thus, claims 22-24 now depend on independent claim 20.

Claims 2, 7, 8 and 16 is objected to as having informalities.

With this in view, applicant respectfully submits that the objections to claims 2, 7-8, 16, and 21-24 be withdrawn.

Claim Rejections Under 35 USC § 102(b)

Claims 16 are rejected under 35 USC § 102(b) as being anticipated by KLAUTSCHEK et al., Patent No. 3,919,609 (hereinafter "KLAUTSCHEK").

The rejection of claim 16 under 35 USC § 102(b) based on KLAUTSCHEK is respectfully traversed.

The KLAUTSCHEK reference teaches a system and method to control a motor by rectifying power from a three phase line to convert three phase AC to a DC voltage provided through a DC link to an inverter (see KLAUTSCHEK, col. 3, lines 25-29); determining an absolute torque value D and an absolute reference torque signal D* based on either a predefined potentiometer setting or a speed signal; adding the two signals to produce a torque error signal AD; and generating a harmonic torque ΔI^* in response to torque error signal. See KLAUTSCHEK, col. 5, lines 13-31.

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" This value [AD] is provided as the input to the controller 24 which provides as an output a quantity designated as ΔI^* . ΔI^* is then provided to a summing junction 28 where it is summed with a reference current value I^* , to obtain the value I^*m used at the summing junction 15 at the input to the current controller 14. The value I^* is developed in a function generator 29 having predetermined characteristics from the reference torque value D^* described above in connection with absolute value circuit 22. **The resulting value of I^*m will be the normally constant t^* modulated by the quantity ΔI^* which represents the harmonics in the torque.** This will result after processing through the current controller 14 and control unit 12, in a current flowing in the DC link 8 which is modulated in such a manner as to tend to cause **the difference between the actual torque value D and the reference torque value D^* to become zero, thereby causing a torque ripple to be cancelled out.**" KRAUTSCHEK, col. 5, lines 13-31.

The KRAUTSCHEK system and method operates to provide torque correction at low frequencies. See KRAUTSCHEK, col. 4, lines 49-52 (A "circuit for providing torque correction at low frequencies is designated as 20 in FIG. 1. It includes first and second absolute value circuits designated 21 and 22 respectively"); see also KRAUTSCHEK col. 4, lines 42-46 ("Such control is possible as long as the period of the machine frequency is long when compared to the regulating time of the current control 14. Thus, this correction may be made effectively at the low machine frequency where torque ripple is most objectionable.").

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The present invention, as defined in amended claim 16 is directed to a method of providing automatic torque control within an electric drive assembly by comparing a produced **voltage command having a certain amplitude attribute and a certain phase angle attribute** with a **second voltage command having certain amplitude attribute and a certain phase angle attribute**; ascertaining the existence of a **certain condition** of said electric drive assembly based upon said comparison; and **generating a signal indicative of undesired torque when the existence of said certain condition exceeds a certain condition threshold value**. See Pending Application, amended Claim 16.

Support for amending claim 16 to have the step of comparing a produced **voltage command having a certain amplitude attribute and a certain phase angle attribute** with a **second voltage command having certain amplitude attribute and a certain phase angle attribute** is disclosed in original claim 1 and previously added claim 21, and in Pending Application, page 13, lines 3-8 as follows:

"[T]he data which is resident within the model portion 16 may alternatively comprises voltage phase angle type data and the data which is obtained from the current regulator 20 and communicated to the model portion 16 may also alternatively comprise voltage angle data."

Additionally, support for amending claim 16 to have the step of "generating a signal indicative of undesired torque when the **existence of said certain condition exceeds a certain condition threshold value**" is found in Applicant's Specification, page 11, lines 19-25 through page 12, line 1 and page 12, lines 8-14.

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"Should these compared voltage values differ by at least a certain amount, a diagnostic signal is generated by the controller 12 to a selectively energizable or activatable positive feed back assembly, effective to activate the positive feedback assembly and to notify an operator or user of the assembly 10 that a certain operational state (c.g., a state in which an undesired amount of torque is being produced) is occurring within the assembly 10." Applicant's Specification, page 11, lines 19-25 through page 12.

"In one non-limiting embodiment, this certain amount exists where the difference between the voltage value identified from the model portion 16 and the voltage value of the signal produced by the current regulator 20 is equal to about 10% of the value identified or selected by the model portion 16. Other threshold values may be alternatively used." Applicant's Specification, page 12, lines 8-14.

The KRAUTSCHEK reference rectifies an AC voltage into a DC voltage and then evaluates torque signals based on absolute torque signals. Thus, because DC torque signal values are used, the KRAUTSCHEK reference determines undesirable harmonic torque signals based on a torque error between D and D*, but does accurately determine a torque error based on phase angle and amplitude attributes of the absolute torque signals D and D*.

Unlike the motor in the KRAUTSCHEK reference which does not take in account phase angle and amplitude attributes of the absolute torque signals, the electric machine 28 of the present invention accurately generates a signal indicative of

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undesirable torque upon occurrence of a certain condition threshold value being exceed by comparing at least one of the produced voltage command phase angle or amplitude attributes with the second voltage command phase angle or amplitude. When an undesirable torque signal is generated using the method of the present invention, a positive feedback or diagnostic signal 18 is provided to a positive feed back assembly 32 to notify an operator of the undesirable torque condition. Additionally, the present invention does not require that the produced voltage command and second voltage command be rectified.

Additionally, the KRAUTSCHEK system and method effectively controls torque at low frequencies. Unlike KRAUTSCHEK, the present invention places no such restraints on the effectiveness of the present invention to generate a signal indicating undesirable torque.

Additionally, the KRAUTSCHEK invention continually attempts to provide a zero harmonic torque but does not produce a signal indicating a certain condition of undesirable torque as the present invention does when a certain condition threshold is reached.

Thus, the operator can then intervene to decide how to correct the generated undesirable torque signal. No such feature or limitation is provided in the KRAUTSCHEK reference.

With regard to claim 20, in OA, page 2, clause 3, Examiner rejected claim 20 under "35 USC 102(b) as being clearly anticipated by Klautschek et al US Patent No. 3,919,609." However, as discussed in the "OBJECTION TO THE CLAIMS" portion,

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supra, the limitations of the objected to and now cancelled claim 21 are now incorporated into independent claim 20 as Examiner suggested in OA, page 5, clause 5, thereby obviating Examiner's objection. Thus, because independent claim 20 is distinct from the prior art of reference, then claims 22-24, which depend from claim 20, are also distinct from the prior art.

With regard to claim 22, the dependency of claim 22 has been changed depending from "21" (now cancelled) to claim 20, in light of the amendment to claim 20.

The KRAUTSCHEK reference does not teach or suggest the features of amended claims 16 or 20.

Clearly, the device and methods disclosed in the KRAUTSCHEK reference does not anticipate the claimed invention. Thus, the KRAUTSCHEK references fails to disclose, teach, or suggest a method having the steps of "providing automatic torque control within an electric drive assembly by comparing a produced **voltage command having a certain amplitude attribute and a certain phase angle attribute** with a **second voltage command having certain amplitude attribute and a certain phase angle attribute**; ascertaining the existence of **a certain condition** of said electric drive assembly based upon said comparison; and **generating a signal indicative of undesired torque when the existence of said certain condition exceeds a certain condition threshold value,**" as is provided by the present invention. Thus, because KRAUTSCHEK fails to provide every feature of the invention as claimed in amended claims 16 and 20, KRAUTSCHEK does

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not anticipate claim 16 and 20, and claims depending therefrom, under 35 USC §102(b).

Therefore, the rejections under 35 USC § 102(b) have been obviated.

Claim Rejections Under 35 USC § 103(a)

Claims 17-19 are rejected under 35 USC §103(a) as being obvious over KRAUTSCHEK in view of Piety, U.S. Patent No. 5,875,420 (hereinafter "PIETY").

The rejection of claims 17-19 under 35 USC § 103(a) based on KRAUTSCHEK in view of PIETY is respectfully traversed.

PIETY is directed to a method of determining machine operating condition based on severity of vibration spectra deviation from an acceptable state. See PIETY, title and Abstract.

Clearly, the methods disclosed in the KRAUTSCHEK reference do not anticipate the claimed invention of claim 16 and similarly, do not anticipate the claimed invention of claims 17-19, which depend from claim 16.

Like the KRAUTSCHEK reference, the PIETY reference fails to disclose, teach, or suggest a method as claimed in amended claim 16, of the present invention that provides the steps "providing automatic torque control within an electric drive assembly by comparing a produced **voltage command having a certain amplitude attribute and a certain phase angle attribute** with a **second voltage command having certain amplitude attribute and a certain**

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phase angle attribute; ascertaining the existence of a certain condition of said electric drive assembly based upon said comparison; and generating a signal indicative of undesired torque when the existence of said certain condition exceeds a certain condition threshold value." Thus, adding the KRAUTSCHEK reference to the PIETY reference does not render the claimed invention obvious. Thus, the PIETY and KRAUTSCHEK references fail to disclose, teach, or suggest a clearly defining the steps of a method for controlling torque within an electric drive assembly using the claimed features of claims 16 of the present invention.

Additionally, there is no motivation to combine KRAUTSCHEK with PIETY to render applicant's invention. The KRAUTSCHEK reference teaches automatic torque corrections for difference in an absolute torque signal and a reference torque signal by integrating the signals until a zero torque is achieved. "Each of the controllers 14, 16, 24, and 31 comprise operational amplifier integrators which integrate the error voltage at the input until an output is obtained which will result in zero input." KRAUTSCHEK, col. 39, and 44-47.

Nowhere does KRAUTSCHEK teach or suggest that a diagnostic signal such as the signals claimed in claims 16-19 be used in combination with the automatic torque error correction method disclosed in KRAUTSCHEK. Instead KRAUTSCHEK teaches continuous torque correction until zero torque is achieved. Therefore, there is no motivation to combine KRAUTSCHEK with the PIETY invention to render applicant's invention.

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Thus, none of the features of the method of controlling torque within the automatic drive system, as defined in claim 16 are provided alone or in combination in either the KRAUTSCHEK or the PIETY references.

Thus, the present invention, as set forth in the amended claim 16, and the claims which depend from claims 16 are clearly distinct from the art of record.

Based on the above, it is respectfully submitted that the amended claims 2, 7-8, 16, 20, and 22 are in condition for allowance, which allowance is earnestly solicited. With respect to the remaining non-cancelled claims, all of which depend from claims 1, 9, 16, and 20, the fact that they claim additional elements or limitations also renders them allowable over KRAUTSCHEK, and PIETY which allowance is earnestly solicited.

It is believed that the present invention as amended is novel and nonobvious over the reference relied upon by the Examiner.

The rejection of claims 16 under 35 USC § 102(b) based on anticipation and claims 17-19 under 35 USC § 103(a) based on obviousness is obviated. A reconsideration for allowance of claims 16-19 is respectfully requested of the Examiner. Additionally, allowance of amended claims 2, 7-8, 16, 20, and 22 is respectfully requested of the Examiner.

Based on the foregoing, the Applicant respectfully submits that all of the pending claims, i.e. claims 1-20, 22-25 are now

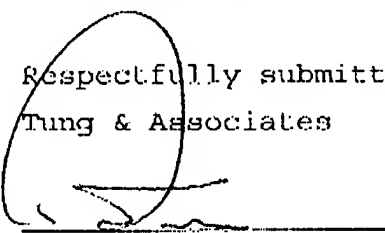
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in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

If for some reason Applicant has not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent the abandonment of this application, please consider this as a request for an extension for the required time period and/or authorization to charge our Deposit Account No.06-1510 for any fee which may be due.

In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicant's representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,
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